

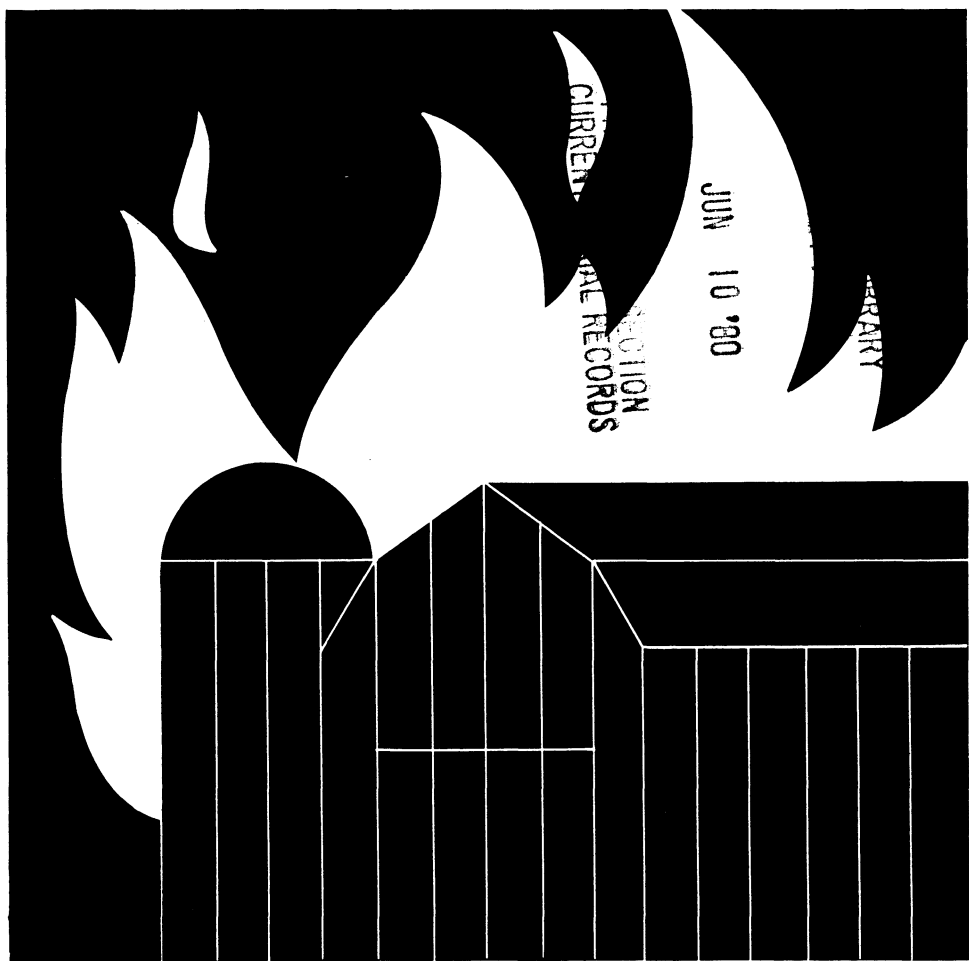
Historic, archived document

Do not assume content reflects current
scientific knowledge, policies, or
practices.

1
Ag 84F
Reserve

Safeguard Your Farm Against Fire

M/S



UNITED STATES
DEPARTMENT OF
AGRICULTURE

FARMERS'
BULLETIN
NUMBER 2150

PREPARED BY
SCIENCE AND
EDUCATION
ADMINISTRATION

See Farmers' Bulletin FB 2227, "Fire-Resistant Construction of the Home—of Farm Buildings," for further information on fire prevention and fire protection. Single copies of this publication are available from the Office of Governmental and Public Affairs, U.S. Department of Agriculture, Washington, D.C. 20250.

CONTENTS

	Page
Fire prevention.....	3
Building location.....	3
Roofing.....	3
Lightning protection.....	4
Chimney testing.....	4
Stoves and furnaces.....	4
Fire-retardant construction.....	4
Electrical installations.....	5
Flammable liquids.....	5
Motorized farm equipment.....	6
LP gas.....	6
Spontaneous ignition of hay.....	6
Trash accumulation.....	7
Matches and smoking.....	7
Farm woodlands.....	7
Fire protection.....	8
Emergency plan.....	8
Equipment.....	8
Community protection.....	11
Water supply.....	12

On January 24, 1978, four USDA agencies—Agricultural Research Service (ARS), Cooperative State Research Service (CSRS), Extension Service (ES) and the National Agricultural Library (NAL)—merged to become a new organization, the Science and Education Administration (SEA), U.S. Department of Agriculture.

This publication was prepared by the Science and Education Administration's Federal Research staff, which was formerly the Agricultural Research Service.

Issued September 1960

Slightly revised May 1970

Approved for reprinting May 1976

Washington, D.C.

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20402

Stock Number 001-000-03795-1 / Catalog No. A 1.9:2150

245 SAFEGUARD YOUR FARM AGAINST FIRE.

By MERRILL S. TIMMINS, Jr., *SEA architect*¹

You can safeguard your farm against fire damage by applying fire-prevention principles and fire-protection methods.

Fire prevention is the elimination of fire hazards in the construction, maintenance, and use of farm property. Installation of a lightning-protection system is an application of fire-prevention principles.

Fire protection, on the other hand, is preparing for action in the event of fire. Organizing a rural fire department is an application of fire-protection methods.

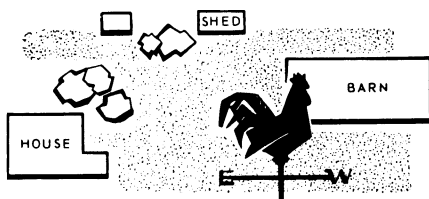
FIRE PREVENTION

Certain faults of farm-building layout and construction are either fire hazards themselves or will increase the spread of a fire. In new construction, these hazards can be avoided by correct design; on existing buildings, they should be found and eliminated.

BUILDING LOCATION

Two common faults of farm-building layout are (1) buildings are located too close together, and (2) buildings are located in line with prevailing winds in the area. The first fault allows fire spread from one building to another even in calm weather; the second increases the risk of fire spread in windy weather.

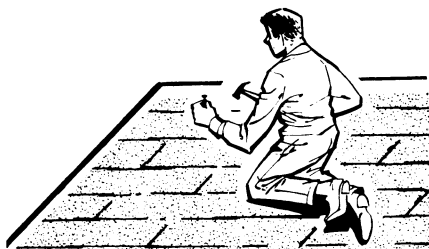
To reduce these risks, locate new buildings at least 100 feet apart and avoid locating them in line with the prevailing winds in your area.



If these building-layout features cannot be managed, take extra care that fire-resistive construction materials are used whenever possible.

ROOFING

Use tile, slate, metal, approved composition or other noncombustible, fire-resistive, or fire-retardant roof coverings. They may be more expensive than combustible roofing materials, but they last longer and reduce the hazard of fire a great deal. Furthermore, in the event of fire, a fire-retardant roof has a



¹ Cooperative Farm Building Plan Exchange, Beltsville Agricultural Research Center-East, Beltsville, Md. 20705.

blanketing effect; it prevents the dangerous updrafts of air that intensify fires and throw burning embers into the air and onto nearby buildings.

Inspect roofs of all buildings frequently, and repair or replace those that are in poor condition.

LIGHTNING PROTECTION

Lightning is a major cause of farm fires. A lightning-protection system can reduce this hazard on your farm.

Although the system must be installed by an expert, you should make periodic inspections to be certain that it is in good working



order. Look for worn spots, breaks, and corrosion, especially where the conductors join the ground connections.

Replace weak or broken parts promptly; each part is vital to the functioning of the whole system.

Ask your insurance company for advice on planning a lightning-protection system for your farm.

CHIMNEY TESTING

Test farmhouse chimneys for leakage every fall. Build a smudge in each stove or furnace, then cover the top of each flue and inspect the whole length of the chimney closely for escaping smoke. Repair or replace chimneys that leak.



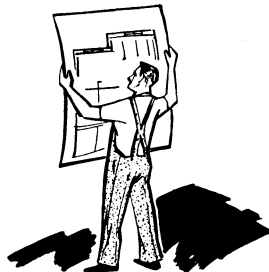
Keep chimney flues clean. This is important to their efficient and safe operation. If soot accumulates rapidly, check the adjustments and operation of the stove or furnace.

STOVES AND FURNACES

Select stoves and furnaces that are large enough to heat properly without overworking. If a forced-air furnace is used, be sure to install safety devices that will protect against excessive temperatures if the blower breaks down or the belt is broken. Keep a replacement belt on hand. Portable heaters are a common cause of farmhouse fires. If they must be used, keep them away from curtains and draperies.

FIRE-RETARDANT CONSTRUCTION

Use "fire stopping" in the construction of farmhouses of more than one story. This building tech-



nique closes off open spaces in the hollow walls at the floorline, so that fire cannot pass easily up through the walls. It is also wise to provide a second stairway, a porch deck, or a roof by which the family can escape if the main stair is blocked by fire.

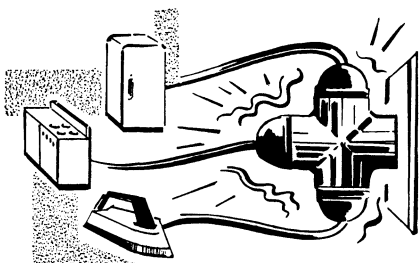
If hay is to be stored above the livestock area in barns, build a solid floor to hold it safely. If the hay catches fire, the floor will not burn through before the stock can be removed.

Install automatically closing doors on hay chutes and stairways in barns. In the event of fire, these doors help prevent it from spreading upward from the livestock area, and they lessen the risk of burning hay dropping from the mow into the livestock area.

ELECTRICAL INSTALLATIONS

Improperly installed electrical wiring and equipment can be a serious fire hazard. Follow manufacturer's instructions for the use of electrical equipment.

Use permanently installed wiring whenever possible. Do not overload your wiring. It is safer to



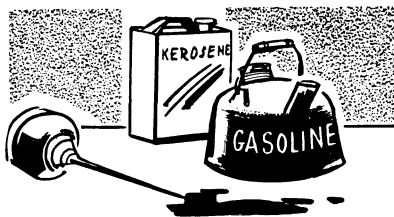
install new circuits where needed to adequately supply new electrical installations. Also, with new circuits, equipment operates more efficiently.

Fuses are for your protection. Use only those of proper amperage. Do not "bridge" across a burned-out fuse. Replace it.

Install wiring in accordance with the National Electrical Code and with State and local safety regulations. Have new wiring done by a licensed electrician. This is particularly important to the life and safety of persons and livestock when electrical equipment—either portable or permanent—is required in damp places or near flammable material.

FLAMMABLE LIQUIDS

Flammable liquids—such as gasoline, kerosene, and naphtha—can become a major fire hazard if improperly stored and used. Their



vapors are very flammable and may be explosive. Use and store these liquids only in well-ventilated places. Do not store them in glass jugs. Use flammable liquids only as fuels; when used to start or quicken fires, or for cleaning equipment or clothing, they can cause violent explosions and fires.

Comply with safety regulations when installing equipment or appliances that use flammable-liquid fuels. Follow manufacturer's instructions for the use of this equipment.

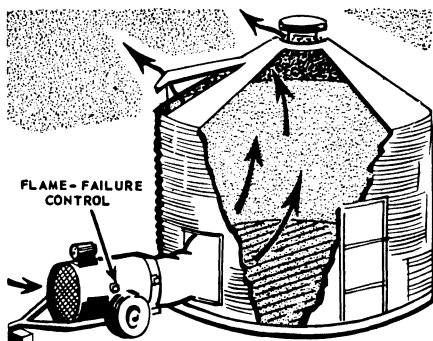
If you store gasoline, check your insurance policies to be sure you are covered. Improper storage of gasoline—such as storing it too close to a building—can void your insurance coverage.

Do not refuel flammable-liquid or gas-burning equipment while it is in operation.

Flammable-liquid burning incubators and brooders, which are

usually left unattended for long periods, should be housed in small detached buildings. Do not operate these incubators and brooders in barns. Check your insurance policies as to coverage on buildings that house brooders. A permit from your insurance company may be required to give you coverage on such buildings.

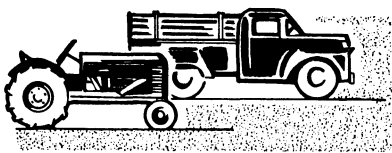
Feed and seed driers can become overheated and start fires if they are worked beyond their rated capacity. Do not risk this fire hazard—get a drier that is properly



designed and big enough for the work. These machines should also have automatic controls to stop fuel flow if the burner flames go out.

MOTORIZED FARM EQUIPMENT

The engines of tractors and other motorized farm equipment may backfire or overheat and start a fire. Since these fires may start a long distance from the farmstead, they are especially difficult to control.



Therefore, it is important to keep all pieces of motorized equipment clean and correctly adjusted, so that they do not overheat.

A further fire hazard occurs when static electricity accumulates on an ungrounded rubber-tired tractor that is being used to drive equipment by a belt. Before refueling the tractor, allow a short time for accumulated static electricity to "bleed" off the tractor into the surrounding air.

An alternative is to ground the tractor frame to a rod driven down to moist earth. Operate tractors only in well-ventilated places and be especially careful if you have to refuel them indoors.

LP GAS

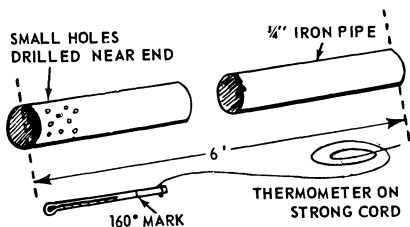
Install and operate LP-gas systems only in properly ventilated locations. Follow the operating instructions of the manufacturer of your equipment. If you smell the distinctive odor of LP gas, and you suspect that the system is leaking, turn it off at the tank and telephone your serviceman for help. Do not search for the leak with a lighted match or other open flame. Store LP-gas fueled vehicles in well-ventilated locations when they are not being used.

SPONTANEOUS IGNITION OF HAY

Hay may heat and catch fire spontaneously if it is not well dried before it is put in the barn.

Cure hay thoroughly before storing it, and protect it against wetting. Use a motor-driven fan to finish curing hay in the mow. This reduces the danger of overheating and of spontaneous ignition. Unless a safe mow-curing system is used, do not put even a small amount of uncured hay in the mow with cured hay.

Inspect mows frequently for several weeks after hay has been stored. To check temperature, push a length of pipe with holes drilled in one end into the hay. Then suspend a small thermometer on a



strong cord down through the pipe to the hay. Temperature readings approaching 170° F. are dangerous. Watch for steaming, irritating odors, wet areas, and "flues" in the hay. If any of these are observed, wet the hay thoroughly and move it from the barn to an open field. Have firefighting equipment ready, because the hay may ignite when exposed to the air. If heating persists, be careful about opening doors and windows before the firetruck arrives, as the additional air might cause the fire to break out.

Do not dig into hot hay or walk on it.

TRASH ACCUMULATION

Do not allow trash or oily rags to accumulate in any farm building.



These may be the starting place for a fire, and they may help a fire to spread.

Keep attics, lofts, cellars, and other storage places clear of trash and accessible for firefighting.

Remove grass, weeds, and dry vegetation from around buildings and along fence rows.

Burn trash regularly at a safe distance from buildings and in a safe place—preferably in a good receptacle. Do not burn on windy

days; even on calm days watch the fire until it is completely out. Follow any local regulations for outdoor burning.

MATCHES AND SMOKING

Use safety matches and store them out of reach of children.



Keep fireproof containers for burnt matches near stoves or other places where matches are regularly used.

Post "No Smoking" signs on barn and stable doors and wherever flammable liquids are stored. Do not smoke in these places yourself, and do not permit other people to do so.

FARM WOODLANDS

If you have farm woodlands, post fire-warning notices around them. Maintain firebreaks between farm woods and brushland or pastures.



Cut firebreaks through the woods themselves to provide access for firefighting.

Remove dead trees and branches regularly. Discuss your woods-fire problem with your local forest fire warden or your State forester.

FIRE PROTECTION

Putting out a fire so that there is little property damage depends on early discovery and quick, calm action.

If your farm is distant from organized help, this increases your firefighting problem. You must have more equipment of your own, and you must be able to call for organized help at the earliest possible time.

Above all, have a simple plan of action—well understood by every member of the family—to sound the alarm and to avoid loss of life.

EMERGENCY PLAN

A basic part of fire protection is to have an emergency plan for action in the event of fire. Make your plan workable in all seasons and for night or day fire alerts.



Calling your fire department and saving your livestock should be part of the plan. Post the telephone number of your fire department and directions for getting to your farm near your telephone.

Discuss your emergency plan with your family, and be sure that it is well understood by all of them.

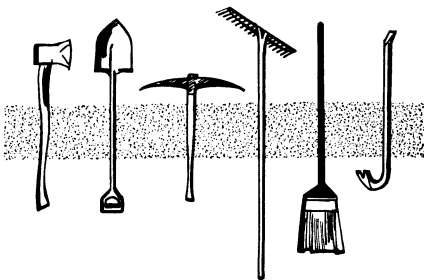
At regular intervals throughout the year conduct fire drills to acquaint everyone with his part in the plan. This may prevent loss of life in the event of a fire on your farm.

EQUIPMENT

A few articles of firefighting equipment can be used to put out small fires on the farm or to keep larger fires from spreading before help arrives.

Home firefighting equipment must do two things—reach the fire, and put it out.

In selecting equipment, consider existing fire hazards such as frame



buildings, stored flammable liquids, electrical installations, motorized equipment, and farm woodlands.

Choose equipment that is easy to operate, dependable in all kinds of weather, and easy to maintain.

- Get suitable equipment.
- Practice using it.
- Keep it in condition for use.
- Keep it handy for use.

Ladders

A portable ladder long enough to reach the roof area of the highest building on the farm is an essential part of the home firefighting equipment.



Two light, strong, one-piece, portable ladders are also useful for fire-fighting. One of them should have a roof hook attached to one end for catching on the roof ridge.

Fire Pails and Barrels

Have a 12-quart pail for every 400 to 500 square feet of floor area. Use round-bottom pails, which are less likely to be used for other purposes. Hang them from hooks or



brackets, or set them on pail racks a couple of feet off the floor. Paint them red and stencil **FOR FIRE ONLY** on them in white or black letters.

Store water in 50- or 60-gallon casks, barrels, or drums. Put these containers where they will be easily accessible for filling pails when fighting a fire.

- Paint them red.
- Fit covers on them that are snug but easily removable.
- Keep them full.
- Use salt or calcium chloride as antifreeze.

Fire Extinguishers

Several fire extinguishers also are needed. Most of the extinguishers on the market are designed for specific purposes. No single type is effective for all types of fires. Use only those that have been approved by the Underwriters Laboratories or Factory Mutual Laboratories.

PUMP-TANK TYPE.—Use a pump-tank extinguisher on wood, paper, cloth, rubbish, grass, and brush fires. Pump-tank types are inex-

pensive to buy and repair, use plain water, are simple to operate, and have few moving parts to get out



of order. They have an effective range of 30 to 40 feet, are economical in their use of water, and can be carried long distances if necessary.

Do not use pump-tank extinguishers on electrical-equipment fires. Use calcium chloride instead of salt as an antifreeze in pump-tank extinguishers.

DRY-CHEMICAL TYPE.—Dry-chemical-type extinguishers are used to put out flammable liquid and electrical equipment fires. The chemical used will not damage compressors, driers, grinders, pumps, motors, or fence controls.

Keep a dry-chemical extinguisher in the farmhouse kitchen, and others near any stationary engines or motors on the farm property. Also keep one on each piece of motorized farm equipment, where it will be handy to fight fires no matter where the equipment may be. One may be taken in the car on trips. Such an extinguisher can also be used to put out small brush or grass fires caused by unprotected exhaust pipes or backfires of harvesting machinery.

The powder used in these extinguishers is not affected by heat, cold, or moisture. It can be bought in bulk to refill the extinguisher at the scene of the fire.

If the extinguisher has a gas cartridge to propel the chemical, weigh it periodically to make certain it is full. If air pressure is

used as a propellant, keep the pressure above the minimum indicated on the gage.

CARBON-DIOXIDE TYPE.—Carbon dioxide extinguishers are suitable for electrical and small flammable-liquid fires. They cannot be recharged on the spot, and should be weighed periodically to make sure that they are adequately charged.

Water Under Pressure

Water under pressure—such as that usually available from the farm water system or from separate power-driven irrigation or “ditch” pumps—is valuable for firefighting, but the pressure and quantity of water available must be sufficient for the job.

Small farm water systems usually are helpful in filling pails and fire extinguishers, but do not rely on them to furnish enough water to put out a fire that has made some headway. If the pump supplying your

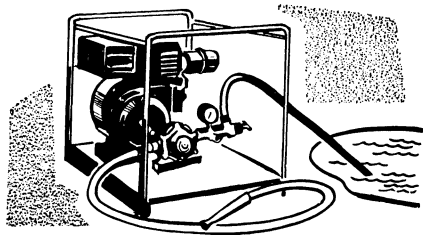


water is run by electricity, it is best to have the powerline come from a yard pole rather than the house. If served from the house, water pressure may be lost in the event the house catches fire.

Keep extra lengths of hose handy for firefighting. Install faucets that are threaded to accept the hose or that can be used with hose adapters.

PORTABLE PUMPS.—Portable irrigation or “ditch” pumps are useful in firefighting, especially where there is no possibility of assistance from rural fire departments.

A water supply of 3,000 gallons from a tank, farm pond, or stream should be available. Choose a pump that has a capacity of at least 50 gallons a minute at a pressure of 60 pounds per square inch. This will deliver a satisfactory stream of water through a spray,



combination, or 1/2-inch, solid-stream nozzle.

A portable pump can be used to help maintain the water supply in the tank of the firetruck. If the ground around a pond is marshy and the truck must be parked some distance away, a portable pump will be particularly helpful.

The pump may be powered by an electric motor or (preferably) by a gasoline engine. It should have carrying handles so that it can be moved where required. If it is driven by electricity, have an electrical outlet near the water supply.

HIGH-PRESSURE ORCHARD SPRAYERS.—High-pressure orchard sprayers will also supply water under pressure for fighting fires.

A nozzle that can be adjusted for a long-range straight stream or a spray, and some extra lengths of hose, are needed to adapt the equipment for firefighting. Do not use too much hose; this can result in ineffective pressure.

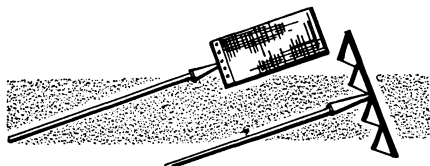
Since these sprayers seldom carry more than 400 gallons of water, plan to refill them quickly.

Manufacturers of sprayers will furnish information on their use for firefighting.

Brush-Firefighting Tools

Get equipment for fighting woods and brush fires. Learn how to use it properly, and keep it handy for instant use.

You can make two effective tools for fighting brush fires—the fire rake and the fire swatter.

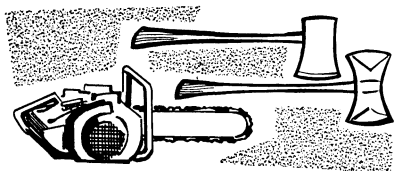


The fire rake is made by attaching a 6-foot wooden handle to a piece of strap iron that has four or five mower-sickle sections riveted to it in the form of a rake.

The fire swatter is made by attaching a 2-foot piece of 12-inch belting to a long handle.

Use strong materials and attach them rigidly. These tools must be able to take hard usage.

For fighting fires in farm woodlands, axes are essential and backpack water pumps are helpful. In actual forest areas, or where large



trees may be encountered, power saws are useful for cutting down dangerous snags or opening wider firebreaks.

Alarm Systems

Since a fire, especially one at night, may make considerable headway before it is discovered, you cannot be sure of getting maximum protection from your firefighting

equipment if you do not have a fire-detecting alarm system.

Fire-detection equipment is available for home use. One type—operated by electricity—has separate detectors, each of which monitors 400 square feet of building area. They are connected to the centrally placed signal bell (usually in the bedroom). The alarm rings whenever the temperature at one of the detectors reaches about 160° F. Freon-operated fire-alarm units also are available.

An alarm system is especially valuable for detecting night fires and for assuring prompt evacuation. Any fire-alarm equipment you get should be approved by the Underwriters Laboratories or Factory Mutual Laboratories.

A horn, bell, or other agreed-upon signal should be used to summon workers from distant parts of the farm to help fight a daytime fire.

COMMUNITY PROTECTION

Fires that are burning hard when discovered, or fires burning over a wide area, are usually too difficult for one person to control. Even relatively small fires are put out much more quickly and thoroughly when trained firefighters are on the job.

If you do not have a rural fire department in your community, get together with your neighbors and your county agent to organize a rural fire department or fire-protection district in accordance with the laws of your State.

Such an organization can give each member of the community the advantages of specialized equipment for firefighting. Also, in some States, each member who has a telephone and 3,000 gallons of stored water may qualify for lower fire-insurance rates. Find out the requirements in your State.

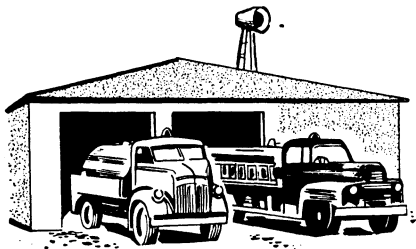
The effectiveness of a rural community fire department depends on

well-maintained equipment, and often on the availability of an adequate water supply on the farms it serves.

There are two general types of rural community fire departments. One is the voluntary-association type; the other is the tax-supported type.

Under the voluntary plan, farmers form a corporation or fire district, buy a firetruck and place it in the care of a nearby organized fire department for use on farm fires. Sometimes farmers receive the service of the voluntary association that protects the nearby rural community. In many small communities, volunteer fire departments are organized to serve not only the community but the surrounding countryside as well.

Under the tax-supported plan, the fire-protection-district officials maintain a fire department or

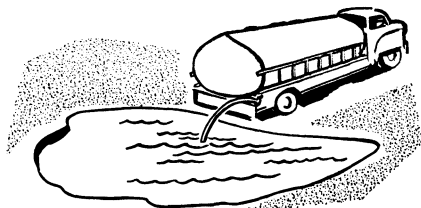


contract for fire-protection services. Frequently the equipment is manned by volunteer firemen to keep operating expenses low. Occasionally one or two full-time firemen are hired, who maintain the equipment, help train the volunteer firemen, and respond to calls.

In many areas, another source of assistance is the local forest fire warden, who maintains equipment that may be used to fight rural fires.

WATER SUPPLY

Rural firetrucks carry much of their own water supply. Individual hose nozzles require about 50 to 100 gallons of water a minute. Enough water for at least an hour's



pumping ought to be available at every farm. If there is a pond or stream within a few hundred feet of the farm buildings, provide a firm road for firetrucks to get to the water. The pond may need to be deepened or the stream dammed to make it deep enough for the suction hose to draw water steadily.

If no other supply is available, additional water can be provided by building an underground reservoir. Some building-supply dealers lend customers wooden forms for constructing concrete tanks. Make a tank of at least 3,000-gallon capacity, so there will be adequate water available even when the tank is not full. Locate the tank in a convenient place for pumping—not too close to farm buildings—and provide a manhole opening for a suction hose. Inspect the tank regularly to see that it is full.

Use elevated tanks that are part of the domestic water system if they have sufficient capacity and if a suitable hydrant or other connection is provided for supplying rural firetrucks.

Before any reservoir is abandoned or destroyed, consider using it as fire-protection equipment.